Avanzamenti recenti della modellistica oil spill nell'ambito del progetto FIRESPILL

FIRESPILL | ARPA FVG (PP 11) | Massimo Bagnarol

Stato di avanzamento del programma MAdAM

Palmanova | 12 ottobre 2022

European Regional Development Fund

Servizi operativi per le emergenze: mantenimento

GNOME Model Driving Forces

Interreg IT-HR FIRESPILL @ ARPA FVG - CRMA

Driving forces for oil spill simulations via GNOME model

Domain	Surface currents	Winds at 10 m	Data archive	Last update
FVG coast	*Source:* CMEMS *Model:* MedFS *Resolution:* 4 km, 1 h	*Source:* ARPA FVG *Model:* WRF *Resolution:* 2 km, 1 h	GNOME-df_WRF_MFS_fvg	2022-10-05
FVG coast	*Source:* ARPAE *Model:* ROMS *Resolution:* 2 km, 3 h	*Source:* ARPA FVG *Model:* WRF *Resolution:* 2 km, 1 h	GNOME-df_WRF_ROMS	2022-10-05
North Adriatic	*Source:* CMEMS *Model:* MedFS *Resolution:* 4 km, 1 h	*Source:* ARPA FVG *Model:* WRF *Resolution:* 2 km, 1 h	GNOME-df_WRF_MFS_na	2022-10-05
North Adriatic	*Source:* ARPAE *Model:* ROMS *Resolution:* 2 km, 3 h	*Source:* ARPA FVG *Model:* WRF *Resolution:* 2 km, 1 h	GNOME-df_WRF_ROMS_NA	2022-10-05
Adriatic Sea	*Source:* CMEMS *Model:* MedFS *Resolution:* 4 km, 1 h	*Source:* ARPA FVG *Model:* WRF *Resolution:* 10 km, 3 h	GNOME-df_WRF_MFS_fa	2022-10-05
Adriatic Sea	*Source:* ARPAE *Model:* ROMS *Resolution:* 2 km, 3 h	*Source:* ARPA FVG *Model:* WRF *Resolution:* 10 km, 3 h	GNOME-df_WRF_ROMS_FA	2022-10-05

Preparazione e pubblicazione degli input previsionali per il modello GNOME

GNOME

Servizi operativi per le emergenze: integrazione

Oil Spill Forecasting Simulations

Interreg IT-HR FIRESPILL @ ARPA FVG - CRMA

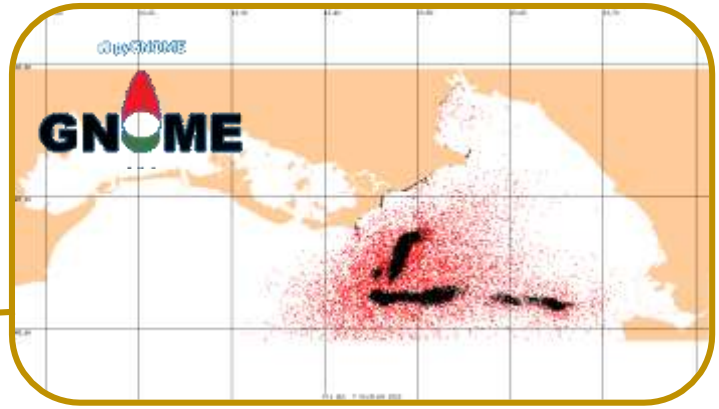
Download

To identify the simulation of interest, please click on the ID, or see the table at the end of the page.

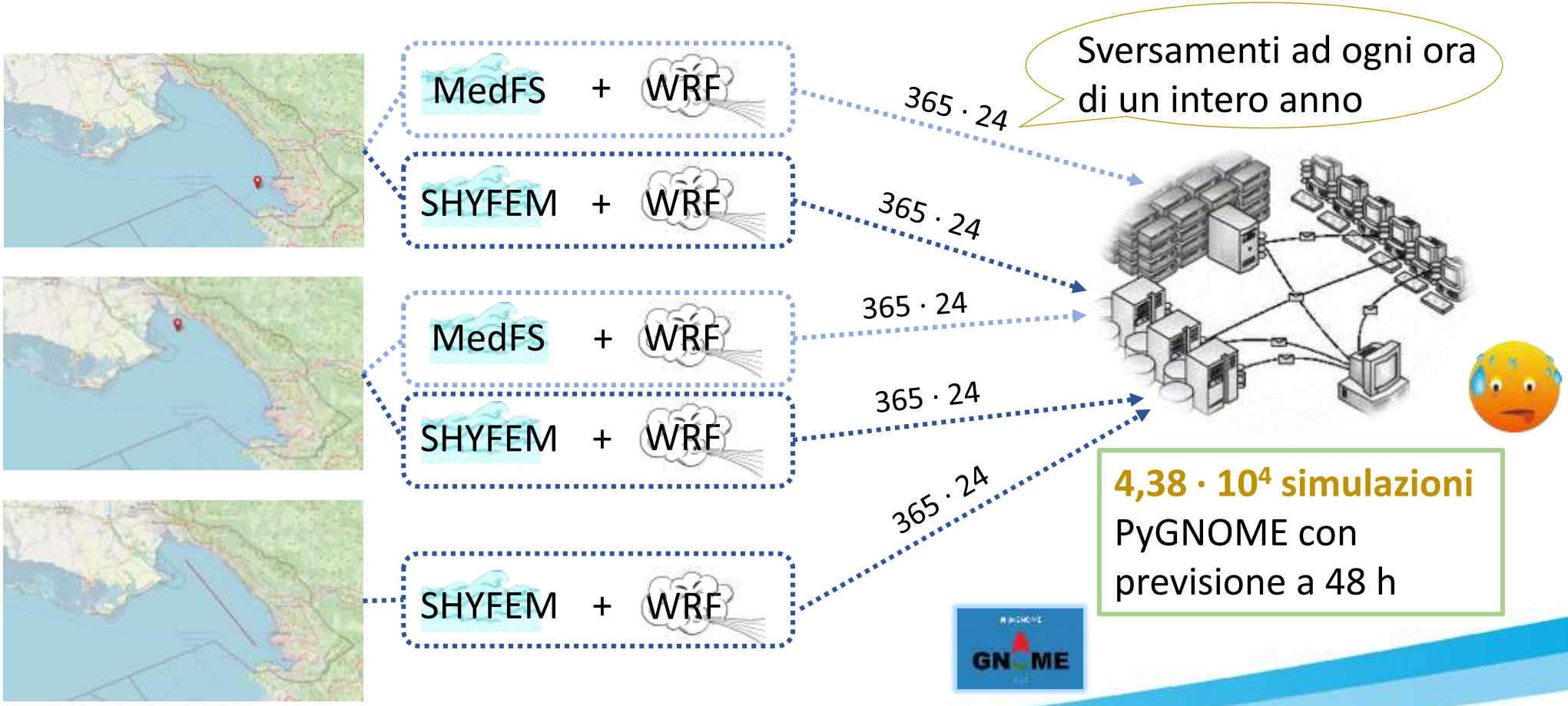
ID	Spill location	Spill start hour	Last update
18E0F10248_0000		00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23	2022-10-05
18E0F10248_0001		00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23	2022-10-05
18E1F10348_0002		00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23	2022-10-05

NEW!

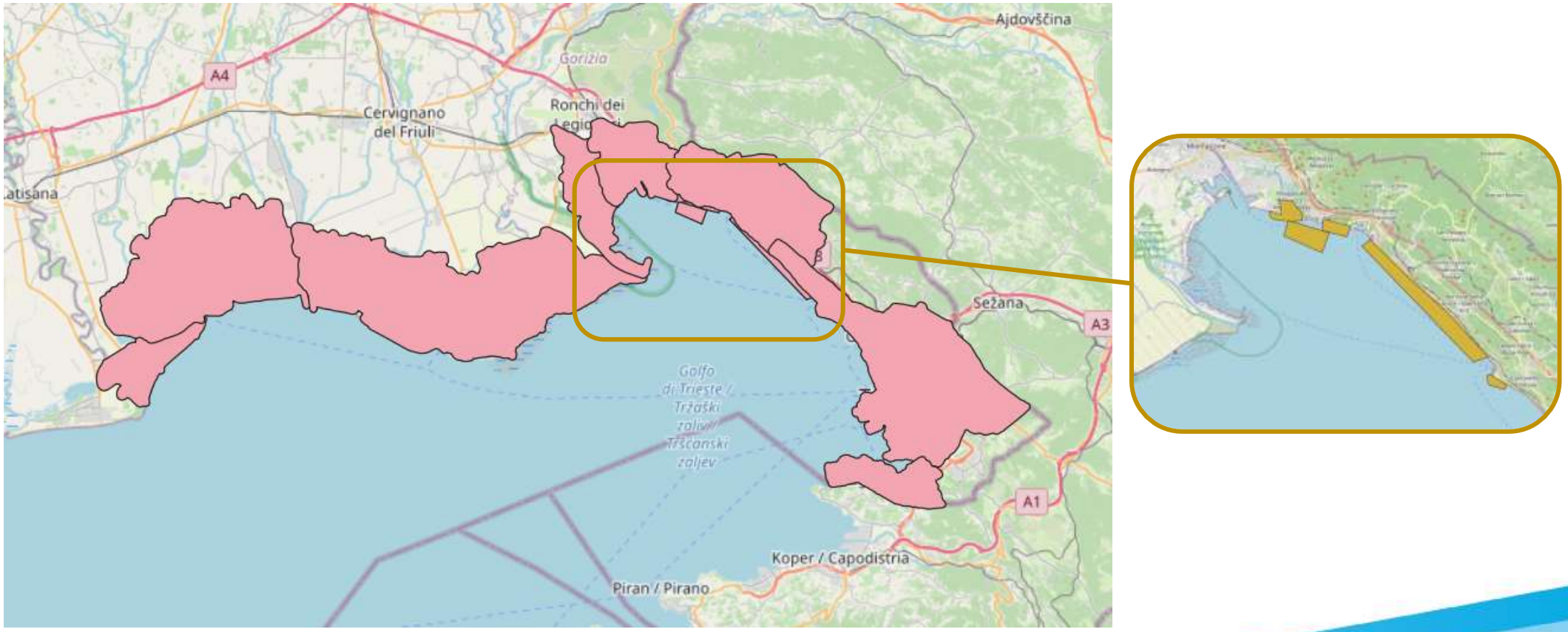
Esecuzione di simulazioni previsionali giornaliere in aree ad elevato traffico marittimo



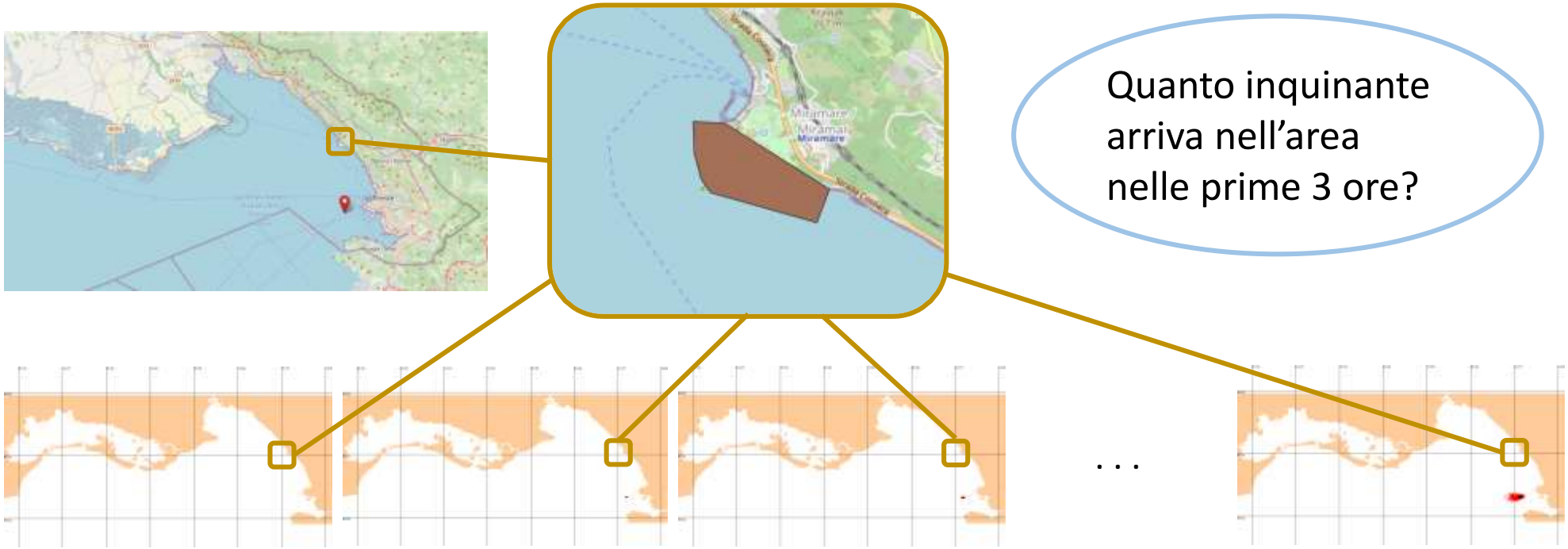
Valutazione della pericolosità relativa all'oil spill: simulazioni annuali



Valutazione della pericolosità relativa all'oil spill: aree analizzate



Valutazione della pericolosità relativa all'oil spill: analisi per ogni singolo sversamento simulato



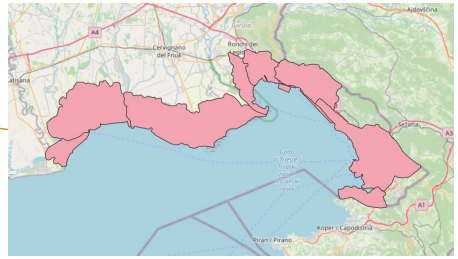
Sono stati contati gli elementi lagrangiani interni all'area ad ogni passo…

Valutazione della pericolosità relativa all'oil spill: analisi per ogni singolo sversamento simulato

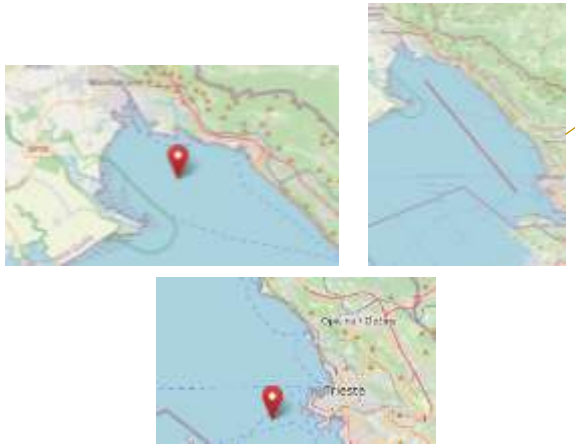
...e ne è stata elaborata una statistica

INDICATOR
min
max
median
mean

∀ area

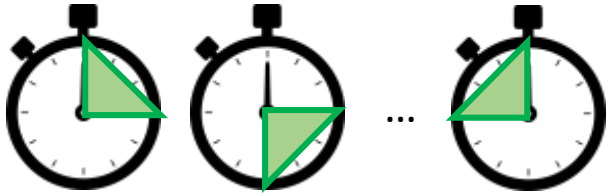


∀ sorgente



∀ rilascio simulato

∀ intervallo di 3 ore dal rilascio



0-3 h 3-6 h ... 45-48 h

Valutazione della pericolosità relativa all'oil spill: suddivisione in base alle condizioni meteomarine

```
00,"90% persistent bora",30,90,5,inf,86400,90
01,"90% persistent strong bora",30,90,10,inf,86400,90
02,"90% persistent scirocco",110,170,5,inf,86400,90
03,"90% persistent strong scirocco",110,170,10,inf,86400,90
04,"90% persistent libeccio",240,300,5,inf,86400,90
05,"90% persistent strong libeccio",240,300,10,inf,86400,90
06,"90% persistent tramontana",330,30,5,inf,86400,90
07,"90% persistent strong tramontana",330,30,10,inf,86400,90
08,"90% persistent calm wind",0,360,0,4,86400,90
09,"50% persistent bora",30,90,5,inf,86400,50
10,"50% persistent strong bora",30,90,10,inf,86400,50
11,"50% persistent scirocco",110,170,5,inf,86400,50
12,"50% persistent strong scirocco",110,170,10,inf,86400,50
13,"50% persistent libeccio",240,300,5,inf,86400,50
14,"50% persistent strong libeccio",240,300,10,inf,86400,50
15,"50% persistent tramontana",330,30,5,inf,86400,50
16,"50% persistent strong tramontana",330,30,10,inf,86400,50
17,"50% persistent very calm wind",0,360,0,2,86400,50
18,"50% persistent calm wind",0,360,0,4,86400,50
19,"50% persistent light wind",0,360,0,6,86400,50
FF,"any wind condition",0,360,0,inf,86400,100
```

Per ciascuna simulazione annuale, i rilasci durante l'anno di riferimento sono stati suddivisi in diversi insiemi in base alle condizioni meteomarine

```
SET
1100
1101
1102
1103
1104
1105
1106
...
5017
5018
5019
FFFF
```

Valutazione della pericolosità relativa all'oil spill: analisi statistica sull'intera simulazione annuale

A partire dalle statistiche sui singoli sversamenti, per ogni insieme di sversamenti individuato dalle condizioni meteomarine, sono state elaborate ulteriori statistiche:

- sulla **percentuale di elementi lagrangiani** all'interno di ciascuna area considerata

```
SIMULATION,AREA,SET,TIME_FROM_SPILL,INDICATOR,MIN,5%ILE,MEDIAN,95%ILE,MAX
21E0F10248,2800,12,1111,P0DT1H30M,min,0.0,0.0,0.0,0.0,0.0
21E0F10248,2800,12,1111,P0DT1H30M,max,0.0,0.0,0.0,0.0,0.0
21E0F10248,2800,12,1111,P0DT1H30M,median,0.0,0.0,0.0,0.0,0.0
21E0F10248,2800,12,1111,P0DT1H30M,mean,0.0,0.0,0.0,0.0,0.0
21E0F10248,2800,12,1111,P0DT4H30M,min,0.0,0.0,0.0,0.0,0.0
21E0F10248,2800,12,1111,P0DT4H30M,max,0.0,0.0,0.54,4.76,5.63
21E0F10248,2800,12,1111,P0DT4H30M,median,0.0,0.0,0.0,0.1,0.12
21E0F10248,2800,12,1111,P0DT4H30M,mean,0.0,0.0,0.07,1.02,1.09
21E0F10248,2800,12,1111,P0DT7H30M,min,0.0,0.0,1.13,6.35,7.38
21E0F10248,2800,12,1111,P0DT7H30M,max,0.0,0.0,19.18,31.23,32.97
21E0F10248,2800,12,1111,P0DT7H30M,median,0.0,0.0,8.96,17.4,18.0
21E0F10248,2800,12,1111,P0DT7H30M,mean,0.0,0.0,9.68,18.33,18.87
21E0F10248,2800,12,1111,P0DT10H30M,min,0.0,0.0,21.34,33.6,36.23
21E0F10248,2800,12,1111,P0DT10H30M,max,0.0,0.0,50.41,55.88,56.03
21E0F10248,2800,12,1111,P0DT10H30M,median,0.0,0.0,35.94,45.96,47.68
21E0F10248,2800,12,1111,P0DT10H30M,mean,0.0,0.0,35.48,45.58,46.21
21E0F10248,2800,12,1111,P0DT13H30M,min,0.0,0.01,53.22,57.4,57.63
21E0F10248,2800,12,1111,P0DT13H30M,max,0.02,0.16,59.19,71.35,73.08
21E0F10248,2800,12,1111,P0DT13H30M,median,0.0,0.09,56.8,66.41,68.67
21E0F10248,2800,12,1111,P0DT13H30M,mean,0.0,0.09,56.64,64.84,67.28
21E0F10248,2800,12,1111,P0DT16H30M,min,0.03,0.18,59.27,71.88,73.58
21E0F10248,2800,12,1111,P0DT16H30M,max,0.11,0.39,59.68,74.26,75.8
21E0F10248,2800,12,1111,P0DT16H30M,median,0.06,0.28,59.6,73.74,75.44
21E0F10248,2800,12,1111,P0DT16H30M,mean,0.06,0.28,59.55,73.47,75.17
21E0F10248,2800,12,1111,P0DT19H30M,min,0.11,0.39,59.57,74.33,75.84
21E0F10248,2800,12,1111,P0DT19H30M,max,0.17,0.48,59.8,74.48,75.98
21E0F10248,2800,12,1111,P0DT19H30M,median,0.14,0.42,59.74,74.4,75.9
21E0F10248,2800,12,1111,P0DT19H30M,mean,0.14,0.43,59.71,74.4,75.91
```

Valutazione della pericolosità relativa all'oil spill: analisi statistica sull'intera simulazione annuale

- sul **tempo di arrivo** degli elementi lagrangiani in ciascuna area

```
SIMULATION,AREA,SET,MIN,5%ILE,MEDIAN,95%ILE,MAX,LANDING_PCT
21E0F10248_2800,0,1100,P1DT4H30M,P1DT7H0M,P1DT10H30M,P1DT19H30M,P1DT19H30M,4.75
21E0F10248_2800,0,1108,P0DT4H30M,P0DT16H30M,P1DT7H30M,P1DT22H30M,P1DT22H30M,35.47
21E0F10248_2800,0,1109,P0DT10H30M,P1DT6H30M,P1DT13H30M,P1DT22H30M,P1DT22H30M,5.90
21E0F10248_2800,0,1110,NaT,NaT,NaT,NaT,NaT,0.00
21E0F10248_2800,0,1111,NaT,NaT,NaT,NaT,NaT,0.00
21E0F10248_2800,0,1117,P0DT4H30M,P0DT16H30M,P1DT7H30M,P1DT22H30M,P1DT22H30M,35.10
21E0F10248_2800,0,1118,P0DT4H30M,P0DT16H30M,P1DT7H30M,P1DT22H30M,P1DT22H30M,33.59
21E0F10248_2800,0,1119,P0DT4H30M,P0DT16H30M,P1DT7H30M,P1DT22H30M,P1DT22H30M,31.59
21E0F10248_2800,0,1300,P1DT10H30M,P1DT12H15M,P1DT19H30M,P1DT22H30M,P1DT22H30M,2.68
21E0F10248_2800,0,1301,NaT,NaT,NaT,NaT,NaT,0.00
21E0F10248_2800,0,1302,NaT,NaT,NaT,NaT,NaT,0.00
21E0F10248_2800,0,1308,P0DT4H30M,P0DT16H30M,P1DT7H30M,P1DT22H30M,P1DT22H30M,38.42
21E0F10248_2800,0,1309,P0DT7H30M,P0DT13H30M,P1DT10H30M,P1DT22H30M,P1DT22H30M,8.77
```

Come mostrare tutti questi dati ai portatori di interesse?

Tramite il software tableau

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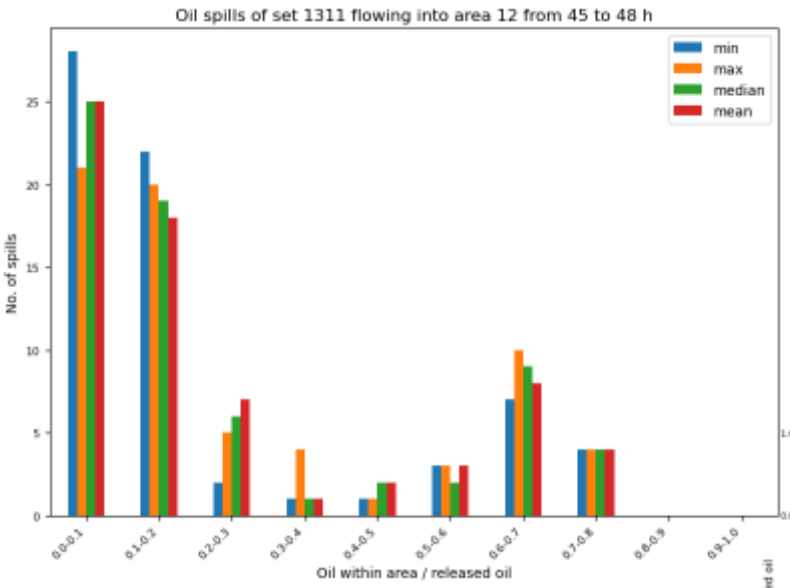
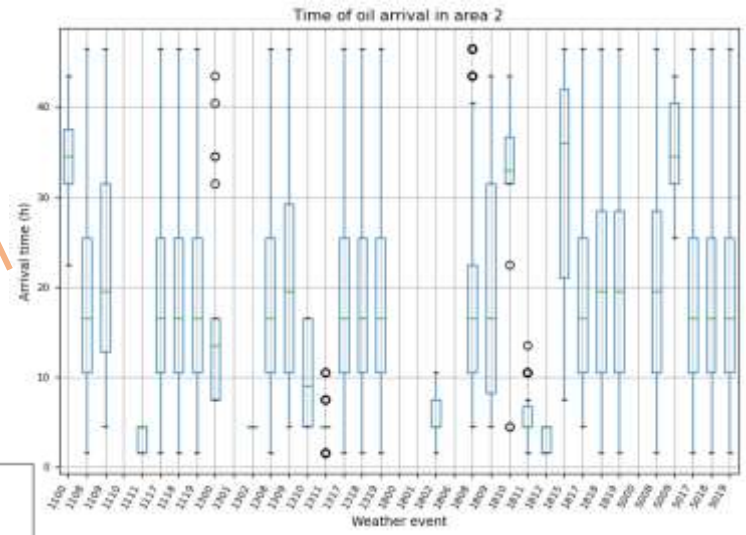
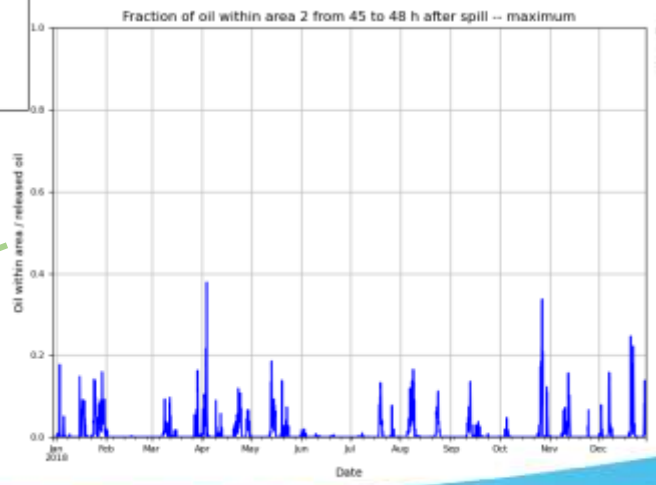
Valutazione della pericolosità relativa all'oil spill: grafici



Tempo di arrivo dell'inquinante





Quantità di inquinante

Altre attività

trieste next

Disseminazione

Validazione

Radar HF

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Interreg Italy - Croatia FIRESPILL
European Regional Development Fund

EUROPEAN UNION

ARPA FVG
agenzia regionale per la protezione dell'ambiente del friuli venezia giulia

Sviluppi futuri

Trasmettere i risultati ottenuti ai **portatori d'interesse**, ad esempio la Protezione Civile Regionale

Concludere l'analisi del rischio di oil spill attraverso la valutazione dell'**esposizione** e della **vulnerabilità**

Trasferire i servizi sviluppati per la risposta alle emergenze sul cluster FENICE, affinché **rimangano operativi** anche al termine del progetto

Contatti

Agenzia Regionale per la Protezione dell'Ambiente del Friuli Venezia Giulia - **ARPA FVG**

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